

CONFIDENTIAL

1e 605/8

ORIGINAL CL BY 235979
☐ DECL ☐ REVW ON 2010
 EXT BYND 6 YRS BY SAME
 REASON 3 d (3)

PROGRESS REPORT
FOR
MONTH OF APRIL 1960

DOC <u>30</u>	REV DATE <u>30 APR 1960</u>	BY <u>018313</u>
ORIG COMP <u>33</u>	GPI <u>56</u>	TYPE <u>03</u>
ORIG CLASS <u>4</u>	PAGES <u>3</u>	REV CLASS <u>C</u>
JUST <u>22</u>	NEXT REV <u>2010</u>	AUTH: HR 10-2

BROADBAND ANTENNA, FILTER AND DETECTOR SYSTEMS

Purpose: To develop a system of antennas, filters and detectors for the 50 mc to 40,000 mc frequency range.

Personnel: Electrical Engineers:
 Mechanical Engineer:
 Mathematicians:

25X1

Status: The engineering models of the 50 mc to 500 mc antenna have been constructed. Progress was curtailed during the last period pending arrival of fasteners for the transmission line. The material used for the models is aluminum coated mylar. The overall thickness of mylar and aluminum is 0.001 inches with 0.0005 inches of mylar and 0.0005 inches of aluminum.

The amount of truncation of the 500 mc to 10,000 mc antenna allowable to maintain radiation pattern quality proved to be undesirable from an impedance standpoint. It was found that the characteristic impedance changed from approximately 50 ohms to approximately 25 ohms as the antenna was truncated to the point where pattern deterioration occurred. A compromise of 30 to 35 ohms was reached. The VSWR remained relatively independent of the amount of truncation. The engineering models of this antenna are now being prepared for final testing.

CONFIDENTIAL

CONFIDENTIAL

- 2 -

Testing of the engineering model of the 1000 to 10,000 mc antenna revealed adverse effects on the high frequency patterns due to the amount and placement of the glue bonding the two halves of the antenna together. Rebonding with a lesser amount of glue is being accomplished and it is expected that the final models will be completed and tested during the next period.

Work has continued on the 10,000 mc to 40,000 mc horn antenna, detector and dielectric waveguide inserts. A model of the detector mount which will be an integral part of the horn has been constructed. Some difficulty has been encountered in reducing the cutoff frequency to below 10,000 mc due to the inaccuracy and uncertainty in dielectric constant of the material being inserted in the waveguide.

The filter synthesis investigation has continued. Two band-pass filters (500 mc to 1000 mc and 1000 mc to 2000 mc) have been constructed using strip transmission line techniques. These filters will not have the desired skirt characteristic since there are too few sections in the filter. The results of tests on the filters should, however, yield further information about the proper construction techniques.

A band pass filter has been received for use with the 50 mc to 500 mc antenna. Acceptance testing on the 50 mc to 100 mc filter showed undesirable peaks of attenuation in the pass band. The filter was returned for repair and further testing.

CONFIDENTIAL

- 3 -

Sensitivity evaluation of the 50 mc to 10,000 mc crystal detector assemblies has been completed. The tangential sensitivity was determined at 55 points in the frequency range. Nine randomly chosen crystals were used in the testing. The average tangential sensitivity of the nine crystals was -50.0 ± 2.5 dbm with the exception of two of the 55 points where the sensitivity dropped to approximately -45 dbm. This discrepancy is believed to be a function of the signal generator since the frequencies in question were at the lower end of frequency coverage of the signal generator. Several signal generators were tried, but little if any improvement in sensitivity was noted.

Future Plans: Work in all phases will continue. Range testing of the 50 mc to 500 mc antenna which was delayed will be accomplished during the next period. Final testing of the 500 mc to 10,000 mc antennas will be accomplished during the next period. Testing of the electromagnetic horn-detector mount will continue.